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(56) Documents cited

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US 4309912

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GB 0584841

US 4141251

US 3646817

EP A 0077180

US 3830108

WO A 84/00119

EP A 0067605

Note US 4309912 and GB A 2112644 are equivalent

(58) Field of search

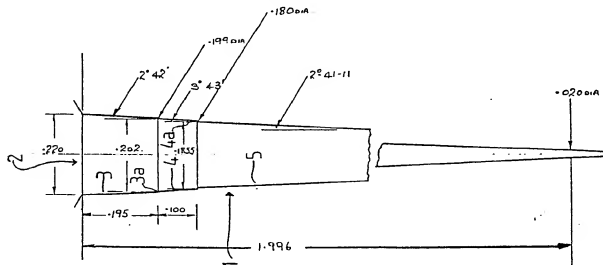
B1X

Selected US specifications from IPC sub-class B01L

## (54) Pipetter tips for pipetters

(57) Previously it has been necessary to provide a series of different tips for pipetters to allow fitment to various types and sizes of pipetters.

A pipetter tip comprises a nozzle, for fitment to one end of a pipetter, having a generally conical internal bore. The bore has three differently tapered sections with a small inwardly extending step between each section. The intermediate section has a greater angle of taper than the two end sections. In use the differently angled tapers allow the tip to fit a variety of different pipetters.





## SPECIFICATION

## Pipetter tips for pipetters

- 5 This invention relates to a pipetter tip for pipetters especially but not exclusively of the mechanical spring-loaded syringe type.
- Pipetters are generally provided with removable tips. The tips can be changed between
- 10 samples to prevent contamination. Previously however it has been necessary to provide a series of different tips to allow fitment to various types and sizes of pipetters.
- According to the present invention there is
- 15 provided a pipetter tip for pipetters comprising a nozzle for fitment to an end portion of a pipetter and having a generally conical internal bore wherein the angle of taper of said bore varies along the length of said bore.
- 20 Preferably the internal bore of the nozzle has a plurality of differently tapered sections each section having a constant taper along the length of the section.
- Preferably also the internal bore has inwardly extending steps between each section of said taper.
- Most preferably three differently tapered sections are provided for engagement with the end portion of a pipetter.
- 30 Preferably also the intermediate section of the three tapered sections has a greater angle of taper than the two end sections.
- Preferably also the first tapered section has an angle of taper in the range of  $2^\circ$  to  $3^\circ$
- 35 from the longitudinal axis of the nozzle, the intermediate tapered section has an angle of taper in the range of  $3^\circ$  to  $4^\circ$  from the longitudinal axis of the nozzle and the third tapered section has an angle of taper in the range of  $2^\circ$  to  $3^\circ$  from the longitudinal axis of the nozzle.
- 40 Most preferably the angles of taper of the three sections are  $2^\circ 42'$ ,  $3^\circ 43'$  and  $2^\circ 41' 11''$  respectively.
- 45 Preferably also the nozzle is 1.996 inches in length with the first tapered section extending 0.195 inches along the nozzle and tapering from a diameter of 0.220 inches to a diameter of 0.202 inches, the intermediate tapered section
- 50 extending 0.100 inches along the nozzle and tapering from a diameter of 0.199 inches to a diameter of 0.1855 inches and the third tapered section extending along the remainder of the nozzle and tapering from a diameter of
- 55 0.180 inches to a diameter of 0.020 inches.
- Preferably also the nozzle is of a polypropylene material.
- An embodiment of the present invention will now be described, by way of example, with
- 60 reference to the accompanying drawing which is a part cut away sectional side view of a pipetter tip for pipetters in accordance with the present invention.
- Referring to the drawing, a pipetter tip for a
- 65 pipetter is in the form of a nozzle 1 and has a

generally conical external shape. The nozzle has an internal bore 2 which has a first tapered section 3, an intermediate tapered section 4 and a third tapered section 5.

- 70 The nozzle has an overall length of 1.996 inches with the first tapered section 3 being 0.195 inches long, the intermediate tapered section 4 being 0.100 inches long and the third tapered section being 1.701 inches long.
- 75 The dimensions given with reference to the drawing are manufacture dimensions and subject to material shrinkage of 0.18 inches per inch.
- The first tapered section 3 has an angle of
- 80 taper of  $2^\circ 42'$ , and decreases in diameter along its length from 0.220 inches to 0.202 inches. The bore 2 has a first step 3a between the first tapered section 3 and the intermediate tapered section 4 which reduces
- 85 the diameter at the upper part of the intermediate tapered section 4 to 0.199 inches in diameter. The intermediate tapered section 4 has an angle of taper of  $3^\circ 43'$  and decreases in diameter along its length to 0.1855 inches.
- 90 The bore 2 has a second step 4a between the intermediate tapered section 4 and the third tapered section 5 which reduces the diameter at the upper part of the third tapered section to 0.180 inches in diameter. The third
- 95 tapered section 5 has an angle of taper of  $2^\circ 41' 11''$  and decreases in diameter along its length to 0.020 inches.
- The nozzle is manufactured from a polypropylene material which, for sterilisation purposes, is autoclavable and irradiatable, without distortion or degradation.
- 100 In use the nozzle 1 can be easily affixed to the end of a pipetter tube with the end of the pipetter sealably engaging with one of the tapered sections 3, 4 and 5 in the bore 2 of the nozzle 1.
- The tip allows samples to be taken easily with the pipetter and can be easily changed between samples to prevent contamination.
- 110 The actual angles of the tapers are arranged such that they are sufficiently close to the angle of taper of the end portions of many common pipetters to provide a good seal but not so close as to produce an interference fit which would make the tip difficult to remove from the pipetter.
- Examples of pipetters which the tip fits are, among others, pipetters manufactured by:
- 120 BCL  
Costar  
Centaur  
Eppendorf  
Elkay  
125 Finnpiptette  
Flow  
Gilson  
Gordon-Keeble  
Labora  
130 MLA

Soccorex  
Unipette  
Volac  
Wheaton

- 5 Modifications and improvements may be made without departing from the scope of the invention.

#### CLAIMS

- 10 1. A pipetter tip for pipetters comprising a nozzle for fitment to an end portion of a pipetter and having a generally conical internal bore wherein the angle of taper of said bore varies along the length of said bore.
- 15 2. A pipetter tip as claimed in Claim 1, wherein the internal bore of the nozzle has a plurality of differently tapered sections each section having a constant taper along the length of the section.
- 20 3. A pipetter tip as claimed in Claim 2, wherein the internal bore has inwardly extending steps between each section of said taper.
4. A pipetter tip as claimed in Claim 2 or 3, wherein three differently tapered sections
- 25 are provided for engagement with the end portion of a pipette.
5. A pipetter tip as claimed in Claim 4, wherein the intermediate section of the three tapered sections has a greater angle of taper
- 30 than the two end sections.
6. A pipetter tip as claimed in Claim 5, wherein the first tapered section has an angle of taper in the range of  $2^{\circ}$  to  $3^{\circ}$  from the longitudinal axis of the nozzle, the intermediate
- 35 tapered section has an angle of taper in the range of  $3^{\circ}$  to  $4^{\circ}$  from the longitudinal axis of the nozzle and the third tapered section has an angle of taper in the range of  $2^{\circ}$  to  $3^{\circ}$  from the longitudinal axis of the nozzle.
- 40 7. A pipetter tip as claimed in Claim 6, wherein the angles of taper of the three sections are  $2^{\circ}42'$ ,  $3^{\circ}43'$  and  $2^{\circ}41'11''$  respectively.
8. A pipetter tip as claimed in any one of
- 45 Claims 4 to 7, wherein the nozzle is 1.996 inches in length with the first tapered section extending 0.195 inches along the nozzle and tapering from a diameter of 0.220 inches to a diameter of 0.202 inches, the intermediate tapered section extending 0.100 inches along
- 50 the nozzle and tapering from a diameter of 0.199 inches to a diameter of 0.1855 inches and the third tapered section extending along the remainder of the nozzle and tapering from a diameter of 0.180 inches to a diameter of 0.020 inches.
- 55 9. A pipetter tip as claimed in any one of the preceding Claims, wherein the nozzle is of a polypropylene material.
- 60 10. A pipetter tip substantially as hereinbefore described with reference to the accompanying drawing.

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